



Emerging Space Industrial Ecosystem Leading to Eventual Beyond Earth Migration: How the U.S. Government Can Avoid Being Left Behind

The Beyond Earth Institute¹

Vice President Kamala Harris, Chair of the National Space Council, recently called for “new rules” to ensure “clarity” and “certainty ... that allow flexibility to incorporate the innovation [in commercial space] that is occurring in real-time.”² In support of that critical and timely initiative, The Beyond Earth Institute submits the following observations and recommendations.

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² <https://www.whitehouse.gov/briefing-room/speeches-remarks/2022/08/12/remarks-by-vice-president-harris-on-supporting-the-commercial-space-sector/>.

Executive Summary

The importance of space for national security, economic vibrancy, and enhancing societal benefits means the next chapter of the Space Age is vital for the future of the United States and humanity. Nothing less than the future technological leadership of the United States is at stake.

By facilitating and stimulating the migration of humans beyond Earth, the U.S. Government can secure this future by creating a space industrial ecosystem. The Beyond Earth Institute believes the U.S. Government should frame the audacious goal of returning to the Moon and establishing a permanent human presence not as the narrow technocratic goals of a federal bureaucracy but as part of America's historic commitment to pioneering and settling new frontiers.

In many ways, beyond Earth migration is akin to the 19th Century opening of the American West, wherein all stakeholders are encouraged to participate. Beyond Earth migration seeks to expand humankind's presence into the endless space frontier that would tangibly benefit and save our home planet. For the first time since the start of the Space Age, with creeping incrementalism in federal space programs posing as progress and endless, shifting "aspirational" timelines are draining the public's confidence in the government's ability to lead an initiative as complex as migration beyond Earth, an alternative pathway has been opened with significant private capital financing a dramatic range of innovative earth orbiting and nascent cislunar space ventures.

These developments contribute to a dynamic space ecosystem, gradually laying the foundation for humankind's eventual beyond Earth migration. A new way of thinking about developing and settling space is emerging. Democratization of space is leading the focus from exclusively government-led "aspirational" programs in favor of "practical, tangible, equitable" projects driven and fueled by the private sector. By its very nature, a private frontier pioneering mindset introduces a risk tolerance threshold far different than the standard government methodology in recent decades.

In our view, advancing the beyond Earth migration context is critical to rejuvenating the vitality of the American spirit of enterprise, which has been key to our historic political, social, and cultural success. We are witnessing a transition to a private sector-led technology and skills evolution into a global space ecosystem comprised of our best industrial, financial, social, and technological contributors, which will continue to expand long after the Artemis program fulfills its missions.

This space industrial ecosystem will synergize the beyond Earth movement and fuel the Great Space Migration.

The role of government should shift now from being a leader of the private sector in the development, operation, and ownership of New Space activities to being the lead stimulator of such activities through incentives similar to those used in our westward expansion.

Government should do what it does best – set the "Rules of the Road," not to own or control the Road. Instead, it should promote and encourage such expansion, provide security, and, most importantly, be a customer, not a competitor, for off-planet goods and services, leaving space settlers and developers to face the risks and reap the rewards.

The White House is to be applauded for initiating a cislunar working group. Still, we urge the Administration to expand its interest portfolio to balancing national security and industrial base activities, impediments, and incentives for the emerging cislunar marketplace.

Accordingly, by Executive Order, President Biden should establish a Beyond Earth Working Group (BEWG) as an interagency body directed to "promote, facilitate and publicly promulgate" - not "study" - the policies, incentives, investments, laws, and regulations essential to expedite the migration of humankind beyond Earth. The BEWG, chaired by the Department of Commerce with NASA as Vice-Chair, should prepare an outline of policy and programmatic changes, including legislation, which should be pursued as "Rules of the Road" for American entities and U.S. global partners to abide by as our institutions and industry begin the journey beyond Earth. Membership in the BEWG should be every government cabinet department and agency, as each has a stake in the near- and long-term expansion of humankind off-planet. Additionally, a parallel federal advisory committee should be established as a vehicle to involve the business, academic, technical, social, and legal communities – domestically and internationally.

Among other recommendations, Beyond Earth Institute also urges the Biden Administration needs to take international leadership in bringing much needed certainty to the exploration, development, extraction, ownership, use, and importation of space-based resources. The Administration should request that the US Congress grant the US Trade Representative "Fast Track" Trade Promotion Authority¹ (TPA) to commence negotiations with our international space & trading partners.

¹ For more than 30 years, Congress has enacted Trade Promotion Authority (TPA) laws to guide both Democratic and Republican Administrations in pursuing trade agreements that support U.S. jobs, eliminating barriers in foreign markets and establishing rules to stop unfair trade. <https://ustr.gov/trade-topics/trade-promotion-authority>



Our History

How We Got Here

When the prior Administration announced the goal of returning American astronauts to the Moon – the Artemis Initiative – with the intent to set up a permanent, ongoing presence and do so within a decade, many in the space community at large cheered.

But did the White House and NASA miss a historic opportunity?

Imagine if the Administration had framed this initiative not as a “mission,” captive to the budgetary and programmatic agenda of an agency bureaucracy, but as “an evolution,” a bold, audacious next step in the American journey of pioneering new frontiers?

Indeed, what if Artemis was framed as the beginning of another migration – this time, a global movement of humankind, beyond Earth led by America – a space migration? A migration that would leverage American and partner scientific, economic, and social dynamism pushing into the Next Frontier (e.g., new institutions, energy sources, habitations, and industries).

A migration truly open to all potential stakeholders – government, private sector, academia, cultural, social, and religious communities – each seeking a sense of ownership and involvement in its development. Finally, a migration that aims to expand humankind’s presence to the endless frontiers would significantly improve life on Earth for humanity and the biosphere.

Are we witnessing the beginnings of a nascent popular movement – a Space Migration – becoming a viable augmentation to the Artemis Program, seeking to lead humankind Beyond Earth? At the Beyond Earth Institute, we believe an analytical case exists for this prospect.

Understandably, public confidence in the government’s ability to lead an initiative as complex as migration beyond Earth is

very low. Contributors to this lack of confidence are expanding budgetary requests, creeping incrementalism posing as progress, and endless, shifting “aspirational” timelines. Alternatively, the private sector, including its for-profit and not-for-profit institutions, has opened new pathways with new forms of leadership – technology, infrastructure, and societal – that will enable migration beyond Earth.

A new way of thinking is emerging about the possibilities of space – Near and Far – as a “livable, workable” sector, open to all who have the time, resources, and energy to contribute.

This democratization of space projects is shifting popular interest away from government-led “aspirational” programs in favor of “practical, tangible, equitable” projects driven and fueled by the private sector – open to all with value-add ideas and interests.

Budget-constrained space agency professionals are being recruited to join an emerging, enthusiastic private sector willing to invest its own and other private resources to bring their expansive space ambitions to fruition.¹ Critics are quick to accuse some of these efforts as “vanity projects,” particularly those by high-net-worth individuals, such as Elon Musk and Jeff Bezos.

Before lambasting these “vanity projects,” it is worth noting that these ventures have generated over 15,000 well-paying jobs², not to mention the overall \$450 billion in private sector invested/financed capital in 2021 alone. They have also contributed to the next generation’s desire to study math and science and pursue engineering degrees in university in the hope that someday they can work in the evolving space ecosystem of launchers, landers, satellites, mining operations, and habitations.

Are there unknowns as to the nature and scope of the space markets being pursued by these space entrepreneurs?

All pathfinding industries (e.g., pharmaceutical, aviation, the Internet) in the history of business succeed, fail, and improve to succeed again. To paraphrase one of these high-net-worth individuals’ development strategies, “Failure is an option here. If things are not failing, you are not innovating enough.”³

That is not the NASA methodology – which has a “no risk” tolerance for program delays or failures due to political and budget oversight, which is often unforgiving.

New space companies and intrapreneurs within some

¹ “NASA Struggles with Shortage of Skilled Workers,” Parabolic Arc, November 24, 2019, <http://www.parabolicarc.com/2019/11/24/nasa-struggles-with-shortage-of-skilled-workers/>

² <https://workingnation.com/private-companies-propelling-job-growth-in-the-space-industry/>

³ <https://medium.com/highlight/top-10-elon-musk-quotes-about-innovation-5f6c8e037646>

traditional major aerospace companies are laying the foundation for innovative and sustained high-tech industries that America and its global partners will lead. These new companies will seek to be the best in achieving their respective missions, with many laying the groundwork for beyond Earth human migration.

We are witnessing a transition to a private sector-led technology and skills evolution into a global space ecosystem comprised of our best industrial, financial, social, and technological contributors, which will continue to expand long after the Artemis program fulfills its missions.

This space industrial ecosystem will synergize the off-planet movement and fuel the great space migration.

Given America's economic, social, and political challenges, why should Americans support such a major, potentially transformational initiative? Many reasons are put forward by space advocates – many of which may seem self-serving or parochial. In our view, advancing beyond Earth migration is critical to rejuvenating the vitality of the American spirit of enterprise, which has been key to our historic economic, social, and political success.

The current widespread perception of the nation's economic and political decline is part of what the late cultural historian, Jacques Barzun, called the Age of Decadence: "All that is meant by Decadence is 'falling off.' It implies in those who live in such a time no loss of energy or talent or moral sense. On the contrary, it is a highly active time, full of deep concerns, but peculiarly restless, for it sees no clear lines of advance. The loss it faces is that of Possibility. [emphasis added] The forms of art as of life seem exhausted, the stages of development have been run through. Institutions function painfully. Repetition and frustration are the intolerable result. Boredom and fatigue are great historical forces."¹

For us, beyond Earth migration into the High Frontier offers no less than endless "possibility" and will have immeasurable positive effects on galvanizing new technologies that not only benefit space travelers but inhabitants on Earth

(e.g., decreasing latency for telecommunications between Earth to the Moon and beyond will benefit Earth-based communications, mining off-planet resources that will

augment Earth's diminishing resources such as rare earth minerals) as well as injecting a sense of ongoing excitement and discovery which has proven historically important to fueling America's global leadership.

Finally, to be blunt, we think it paramount that the best of the West's moral and jurisprudence traditions regarding human rights be embodied in the legal and policy regimes beyond Earth versus the autocratic values of adversary states which aggressively seek to dominate the High Frontier.²

If the private sector is leading the Off Planet Space Migration, then what is the critical role of government? Institutional Certainty.

The Beyond Earth Institute has been hosting a series of webinars over the past year or so focused on the underlying policy and fiscal questions inherent in such a bold initiative:

- Who should drive this migration – government or the private sector?
- Do government "aspirational" programs compete with the private sector for resources – capital, human, ideas, regulatory – intentionally or unintentionally?
- Who should pay for the goods and services needed to ensure the success of the goal of establishing a permanent settlement on the Moon – private investors or the taxpayer?
- Should these endeavors be developed through public-private partnerships or government as a customer only, not an owner/operator?
- Should space and its potential habitats have their own set of laws and international conventions balancing development with environmental impact, similar to the Antarctica Convention?
- How will commercial property rights and liability issues be fairly administered and decided?
- For that matter, what legal regimes will oversee intellectual property disputes, as well as potential criminal behaviors?
- Finally, as humankind steps beyond our planet's shoreline, LEO, MEO, GEO, and wades into the "Cosmos Sea," does this "expansion" translate into nothing less than humankind's seemingly inexorable desire to explore and eventually extend our species into the Cosmos?

¹ Dawn to Decadence: 1500 to the Present, by Jacques Barzun, Perennial, 2001

² (For more insight into China's space, see the 2022 Annual Threat Assessment of the U.S. Intelligence Community, <https://www.dni.gov/files/ODNI/documents/assessments/ATA-2022-Unclassified-Report.pdf>)

Beyond Earth Migration: Our Government Role Has Plenty of Precedents

Our own history provides us with guideposts to consider America's westward expansion.

In the space community, we are familiar with the many offered clichés that compare America exploring the High Frontier with our 19th Century expansion into the uncharted Western Frontier.

There is a reason references to our frontier mentality are so commonplace. It is in America's DNA. No one stated it better than Frederick Turner, the 19th century historian who helped popularize the idea that America's dynamism and frontiers were synonymous. In one of his essays, he stated: "Since the days when the fleet of Columbus sailed into the waters of the Americas, America has been another name for opportunity, and the people of the United States have taken their tone from the incessant expansion which has not only been open but has even been forced upon them. He would be a rash prophet who should assert that the expansive character of American life has now entirely ceased. Movement has been its dominant fact, and, unless this training has no effect upon a people, the American energy will continually demand a wider field for its exercise."¹

The Great American Migration of the 19th century opened the western regions of North America to a flood of immigrants fueled by the US government's promise of free land ownership for businesses and homesteaders. Government stimulated this migration by funding competitions for urgently needed transcontinental infrastructure – railroads; telecommunications (in this case, telegraphy, which provide critical national connectivity with profound commercial and national security implications); and commercial trading concessions – trading outposts.

Government also provided a legal basis to ensure citizens' certainty of ownership rights in their homesteads, ranches, settlements, and business interests by organizing vast western lands into governing jurisdictions or territories and States.

These frontier jurisdictions, in turn, also provided legal frameworks and resources, e.g., U.S. Marshals Service and the U.S. Army, for law and order, providing necessary institutional stability in these new lands.

In sum, the critical contributions government made to the expansion and ultimate development of the western lands of North America included transportation (railroads), communications (telegraph), land ownership (homesteads), commerce (trading posts), law & order (territorial governance), and a shared, national identity through higher education (e.g., land grant universities).

Of course, rather than glorifying this relentless expansion, we should also acknowledge that it came at a huge cost of untold devastation to the Indigenous populations, ecosystems, and species displaced by our voracious appetite for commercial exploitation. Unfortunately, wherever humanity goes, we bring with us the good, the bad, and the ugly of our species. Space will be no different unless we apply history's lessons through a clear set of Rules of the Road holding all of us accountable to others for our misadventures and our better angels for our conduct.

Beyond Earth Migration: Reaching Beyond 20th Century Aspirations to 21st Century Space Industrial Expansion

America, and the world, in the first quarter of the 21st century, are on the cusp of another Great Migration. This time, off-planet with American-led humanity seeking future opportunities within our Solar System, and, particularly, in the near term, the Moon, and then onto Mars, and even O'Neill Cylinders at Lagrange points, in the longer term. The new immigrants will be multi-national, as were America's original immigrants. These space immigrants and the businesses necessary to support them must be the most creative, opportunistic, skilled, and ready for the greatest challenges facing any generation since the mid-19th Century.

Mirroring the past, the required tools for their successful settlement and development are also nearby today - rockets, railroads; lasers telegraphs; and private capital for commercial development of resources to support human expansion, such as housing, mining, manufacturing, and food production.

Also, similar to our westward expansion, our businesses and institutions will need "Rules of the Road" – to frame tax, liability, property ownership, human rights, and law and order for beyond Earth ventures. Existing legal and regulatory regimes must be updated and coordinated with other spacefaring nations to best enable our next Great Migration.

¹ "The Significance of the Frontier in American History," a paper read at the meeting of the American Historical Association in Chicago, 12 July 1893, during the World Columbian Exposition. <http://nationalhumanitiescenter.org/pds/gilded/empire/text1/turner.pdf>

Proper Role of Government – Becoming a True Partner - No Longer a Paternal Competitor

The role of government should shift now from being a leader of the private sector in the development, operation, and ownership of New Space activities to being the lead stimulator of such activities through incentives similar to those used in our westward expansion.

Government should do what it does best – set the “Rules of the Road,” not seek to own or control the Road; promote and encourage the expansion; provide security; and, most importantly, be a customer, not a competitor for off-planet goods and services. This will leave New Space settlers and developers to face the risks and reap the rewards.

As in the past, government must have a continuing, focused role, providing stability and certainty in the areas in which it is best suited: the legal regimes that ensure private property ownership rights - where humans settle, what they extract and develop, where they can sell or trade their products. Earth’s legal regimes are nationally driven, but off-Planet legal regimes should be ubiquitous, without regard to national jurisdictions. It is within the purview of governments and their international institutions to develop and codify these rules.

These New Space pioneers will also need the safety and security of law and order close by as a safe harbor in times of trouble to which they can turn for help and support. Public safety – law and order – will be just as crucial to future Moon or Mars settlements as it was on the edge of the frontier in the 19th century. At that time, the U.S. Government extended its power to provide security for its citizens and protect its national interests in distant areas by establishing a system of military outposts in the West. Until local communities could protect and police their communities, the U.S. Cavalry did the job.

Clustered around these military outposts were privately owned trading posts, often under US Government concessions, to not only support the Cavalry, but incoming ranchers, settlers, and

supporting businesses. The outpost would continually grow to a settlement and the settlement into a town. The Cavalry would close the fort, but the settlement would remain with its own local political governance. The US Space Force could develop and support just such outposts between and on the Moon – providing security, stability, and a protected transfer venue for trade between the Earth and the Moon.

It is also important to remember that America has adversaries and competitors to our expansion into the space domain. These nations have multi-decadal space strategies that call for permanent settlements on the lunar surface in the coming decades.

While some are hesitant to pull the U.S. into another space race, we would assert that with or without the United States, the 21st century space race has already begun. From the viewpoint of America’s adversaries, dominance in space is integral to their challenging America as a major power on Earth and in the High Frontier¹.

Finally, government needs to remain engaged as a public fiduciary in the development of worker safety and environmental conditionalities essential to protect and support humankind beyond Earth.

Some argue, based in part on the costs and risks associated with life support infrastructure for humans, e.g., space radiation, that robots should replace humans in the exploration of space. We view this as a false choice. “There isn’t a battle between robots and humans -- that’s comparing apples and oranges,” said James Garvin, chief scientist at NASA’s Goddard Space Flight Center. “We send the robots as our pathfinders and scouts, and they open the frontiers so we can decide where and when to send the people.”²

Government, in consultation with the private sector, should consider and establish with certainty those policies – including their actual costs and benefits.

Beyond Earth Migration: Are the Nations of the Earth ready for their populations to go Beyond Earth?

History’s great migrations have involved masses of diverse people, cultures, and interests moving away from one condition – geographic, economic, religious, political, conflict – which they deem unacceptable to themselves and their families’ prospects, health, and safety to another,

which they hope will present greater opportunities, security, and circumstances. To think a Space Migration will evolve differently confuses government sponsored programs – missions - with a fundamental movement of humanity.

¹ In its recent report, the Atlantic Council predicts that, at its current pace, “The United States will most likely lose space superiority to China within the next decade.” <https://www.atlanticcouncil.org/in-depth-research-reports/report/small-satellites-the-implications-for-national-security/>

² <https://www.wired.com/2012/04/space-humans-vs-robots/>

Following the Second World War, the international governments, led by the United States, created a variety of institutions and principles to address political, economic, and social stress points amongst nations. One of those principles was that nations with integrated economies seek peaceful responses to resolve disputes between them rather than resort to tit-for-tat trade wars or actual, open conflict. This principle was fundamental to the foundation of the Bretton Woods institutions, which form the basis of today's global trading system, and has enabled continued economic growth and a tremendous reduction in global poverty over the past eight decades.

Indeed, real technical, financial, and political barriers to space migration exist in 2022. But in the same period between Columbus and Jamestown (115 years), it is conceivable that exploration, development, and finally human settlement beyond Earth, i.e., the Moon, and Mars, could occur in less than half that time – by the 2040s/50s.

Public and private sector technological development efforts are accelerating humanity's movement off-planet.

The international community must recognize early on that this migration beyond Earth must be orderly, equitable, and open to all seeking to participate. This obligation is best exercised through pro-active leadership of existing international organizations and transparent processes.

Inter-governmental agreements such as the Artemis Accords are an essential first step, but more must be done beyond the political level to ensure the same openness serves the interests of the economic, security, popular, social, and scientific communities. These interests are vital to expanding the popular dialogue about the "how, when, who, and where" of beyond Earth migration. This popular dialogue cannot be ignored. The people, however, can ignore unresponsive bureaucracies, leading to activities outside the comfort of national governance and multi-national organizations.

For example, private ownership of off-planet resources is a popular topic among space agencies, national governments, and private companies. Notwithstanding,

there remains no clear, credible answer to enforceable property rights for space sources, except vague, generalized international agreements and treaties. Throughout history, this type of ambiguity has led to conflict—institutional, legal, and often physical—among governments, companies, and individuals.

The Past is Our Prologue Today: How to Develop Rules of the Road for the Nation and its Commercial Sector for the Great Space Migration

In the 19th century, the U.S. War Department and the Department of the Interior were the US Government agencies leading our westward expansion. In the 20th century, it was exclusively NASA, DOD, and the U.S. State Department leading our efforts in space – until the Reagan Administration opened space policy development to involve input from all cabinet departments and agencies, as well as the commercial sector. The Bush 41 Administration reestablished the National Space Council and, during its tenure, issued significant civil and commercial space policies and space-related legislation, creating the framework we have in place today.

Under the previous Administration and its current successor, the National Space Council has continued to issue specific Presidential initiatives to promote American space leadership.

America and its institutions, government, and industry are actively planning to extend their presence and activities - beyond near Earth through cislunar, onto the lunar surface, and beyond. Billions of dollars in American public and private capital are currently being allocated for this journey to extend humankind beyond our host planet to our nearest, largest satellite – the Moon. Consequently, similar to the Reagan Administration's contribution to space commercialization - NSDD-144 and its policy goals - the Biden Administration has a unique opportunity to develop the appropriate policy framework – "Rules of the Road" - for America and its commercial space industry as we extend ourselves to cislunar space, the Moon, and beyond.

PRIORITY PROPOSAL #1

The President Should Establish a Beyond Earth Interagency Working Group for the Space Sector on the Migration of Humankind Beyond Earth

The Biden Administration – notably Vice President Harris¹ – has recognized that the time is right to create a new body of Rules of the Road for the 21st century of upcoming space development.

By Executive Order, President Biden should establish a Beyond Earth Working Group (BEWG) as an interagency body directed to “promote, facilitate and publicly promulgate” - not “study” - the policies, incentives, investments, laws, and regulations essential to expedite the migration of humankind beyond Earth.

The BEWG should prepare an outline of policy and programmatic changes, including legislation, which should be pursued as “Rules of the Road” for America and its global partners to abide by as our institutions and industry begin the journey off-planet. Given the complexities of any business – domestic and international – where gathering and use of data analytics, finance, intellectual property, spectrum allocation and management, property rights, dispute resolution, and other rules and policies are critically involved in a beyond Earth national effort- the U.S. Department of Commerce should be the Beyond Earth Working Group (BEWG) Chair. NASA should serve as its Vice-Chair.

Commerce should also be the leadership department amongst the business community and proactively reach out to the U.S. Chamber of Commerce, U.S. Council on Competitiveness, National Federation of Independent Business (NFIB), Business Roundtable, National Association of Manufacturers (NAM), directly or through its district export councils – all essential institutions with policies and opinions to be considered in supporting the Administration’s proposed space-related rulemaking.

Membership in the BEWG should be every government cabinet department and agency, as each has a stake in the near- and long-term expansion of humankind beyond Earth. Additionally, a parallel federal advisory committee should be established as a vehicle to involve the business, academic, technical, social, and legal communities – domestically and internationally.

All these activities should operate under a limited planning horizon. The scale and scope of their mandate is too broad for a single, specialized government agency, such as NASA, to try and coordinate. It is also too risky to allow any independent regulatory agency, e.g., FCC or EPA, to work in an ad hoc manner to develop or issue rules and regulations that may not be coordinated with those of the Administration or industry.

It must be considered that our international space partners and, most assuredly, adversaries will look to our nation’s Rules of the Road as bringing both certainty and market stability to this expanding civil science and business sector.

The proposed BEWG can create and sustain a whole-of-government approach, which is essential to the success of America’s space leadership and survival. This will involve the concerted facilitation of space and non-space stakeholder discussions regarding a set of common goals, policies, and rules essential to promote and facilitate this generation’s New Space ambitions. The BEWG must go beyond aspirational goal setting and focus on specific policy initiatives which could serve as the basis for tangible growth of space commerce. The BEWG can also propose incentives, such as prize awards, for achievements in off-Plant projects in emerging service sectors such as infrastructure, transportation, communications, habitation, and economic development, with procurement authority to empower the appropriate government agency to procure and utilize these services rather than compete with them.

The Beyond Earth Working Group (BEWG) - An Interagency Working Group Organized to Chart the Rules of the Road for the Migration of Humankind Beyond Earth - Cislunar, Moon, and Beyond

The power of the Executive in administrative policy areas is significant. Common sense, pro-growth administrative adjustments, or clarifications of applicable Executive branch agency policies can immediately impact an emerging marketplace, such as Space. It can serve as a baseline for future legislative action.²

However, developing tangible policies in an interagency process is often more difficult to manage than achieve. Success of these processes is determined by the clarity of mandate, the strength of leadership, and the commitment of participants.

¹ Text of VP Harris Oakland Speech, August 12, 2022.

² Example is NSDD-144 and the following multiple pro-space commercialization laws and regulation.

Recommendation 1

There must be a clear mandate to the BEWG leadership and participants in the interagency process that the goal of the working group is the formulation of specific, measurable objectives and courses of action rather than aspiration goals, which have a high probability of near-term adoption and implementation in the present Administration. This mandate and its initial proposed agenda will set the baseline for its work. Its participants need to bring to the process their departments' ideas of focused, pro-active, tangible policies across all the areas of economic activity in space commerce that can make an immediate impact (policy) with longer-term consequences (law).

Recommendation 2

Any proposed initiative(s) must be equally bold in scale and scope to match the market opportunity presented. The chosen interagency group leadership must be committed to a broad-based effort, not incremental or narrow initiatives. Congressional involvement and even support might be helpful but should not be determinative. The overt support of the media, academic community, think tanks, and private sector, e.g., the U.S. Chamber of Commerce, Aerospace Industries Association (AIA), National Federation of Independent Business (NFIB), American Institute of Aeronautics and Astronautics (AIAA), etc., should also be fostered.

Recommendation 3

The BEWG membership needs to be reflective of the entire Cabinet, ensuring participation and a flow of ideas from across the entire Administration, which in turn is reflective of all stakeholders of the national economy. As with the Commercial Space Working Group (CSWG), broad

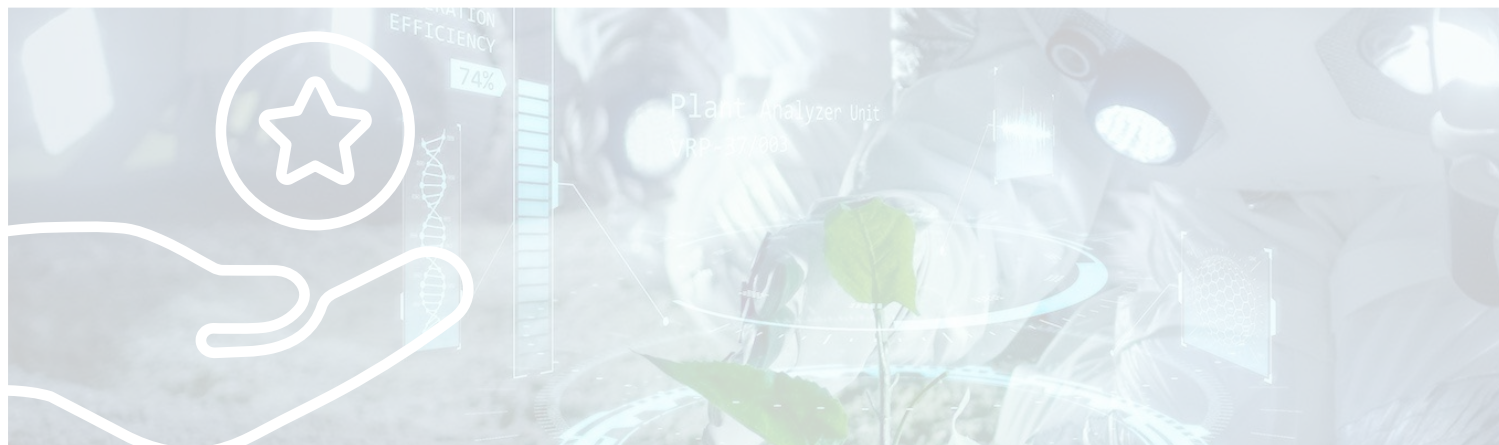
participation encourages creative yet pragmatic ideas, stress testing toward realism, and, as agreed, unanimous support – public and private. NASA's participation as a senior member of the working group, e.g., Vice Chair, also promotes inclusion and provides access to significant technical information and historical precedence.

Recommendation 4

The working group membership needs the authority to speak for their departments and agencies at the table.¹ They may delegate to their staff the work of the group, but not the responsibility to be at the table when decision-making is required. The working group needs to balance its role to promote and facilitate common sense policies to stimulate space commerce in general and economic expansion into cislunar space. Specifically, existing rules and norms are relevant and can be upgraded to support government's role as a facilitator, promoter, and even customer for goods and services along the way.² Quantifying these applicable "rules of the road" is the clear mandate of the working group.

Recommendation 5

Consequently, examples of the breadth of possible areas of policymaking are: international norms, cooperation, agreements, and jurisdictional boundaries; defense and national security deployments into cislunar; domestic regulations; streamlined space-related licensing, such as launch and spectrum licensing; administrative processes; investment rules, tax incentives, competition flexibility, and insurance; government procurement carveouts; dispute resolution forums; and other growth-oriented initiatives will significantly enhance the New Space economy, and more certainty of the "rules of the road" for our economic expansion into the new "territories" beyond Near Earth.



¹ Usually, the primary member of a department or agency is at the Assistant Secretary level (PCS).

² This approach does not discount the opinion of some that this new sector requires entirely new rules and regulations to address the physical challenges of extended human economic activity in space. On the contrary, international norms and cooperation agreements, will take decades of negotiation and diplomacy to an uncertain end. In the interim, however, American firms doing business on the lunar surface need to understand some basic rules and regulations relative to investment, insurance, property rights, and dispute resolution. If those rules pertaining to such activity is merely extended to these new territories, then there will be more certainty – sooner - brought to the sector.

PRIORITY PROPOSAL #2

The Biden Administration Should Request Fast Track Authority from the Congress to Negotiate a Space Trade Agreement.

The Biden Administration needs to take international leadership in bringing much needed certainty to the exploration, development, extraction, ownership, use, and importation of space-based resources.

The Administration should request that the US Congress grant the US Trade Representative “Fast Track” Trade Promotion Authority¹ (TPA) to commence negotiations with our international space & trading partners, e.g., the European Union, the U.K., and Japan, the purpose of which is to establish a Space Trade Agreement (STA) - “Rules of the Road” for the trade and investment in off-planet commerce.

As noted above, there is growing ambiguity in the application of basic economic laws and regulations to space resource development. The international trading system could address this ambiguity by developing a trade agreement for participating nations considering off-Planet businesses, incorporating the best principles of international trade and dispute resolution already in place on Earth.

Current international treaties, accords, and agreements are ambiguous at best, do not address the needs of commercial firms, and are conflicting at worst on the needed certainty in basic business norms about property rights, dispute resolution, insurance, competition, and tax laws, employee rights, and enforcement. Without these norms in place, off-planet business expansion, encouraged by individual national interests on the Earth, will be doomed to repeat our planet’s history of colonialism, exploitation, environmental damage, human suffering, and armed conflict.

This STA should accomplish the following:

- Include all interested current and future spacefaring nations.
- Address all the economic and jurisdictional/enforcement issues today, providing the needed certainty for popular investment and business expansion tomorrow.
- Effectively bring all off-planet business activities into the international trading system.
- Mitigate future disputes among nations competing for scarce space resources through the World Trade Organization in lieu of conflict.

ADDITIONAL CONSIDERATIONS

The Interagency BEWG Should Consider Updating our Domestic and International Laws and Regulations Across Our Entire Economy.

Exemplary of the Major Tasks Ahead - By Department or Agency:

Department/ Agency	Mission	Related Authority	Policy Considerations
Commerce - Chair	Promote & Facilitate the Nation’s Business	<ul style="list-style-type: none"> • Lead – Business Community Advocate (Office of Space Commerce) • Lead – Civil Atmospheric and Situ Awareness (NOAA) • Lead – Space economic analytics • Lead – Export Controls • Lead – Economic Development for Space Business • Lead – Space Patent Protections 	<ul style="list-style-type: none"> • Targeted Data Base for Space-related businesses <p>Review of international trade, tax, competition, patent, and corporate structures</p>

¹ For more than 30 years, Congress has enacted Trade Promotion Authority (TPA) laws to guide both Democratic and Republican Administrations in pursuing trade agreements that support U.S. jobs, eliminating barriers in foreign markets and establishing rules to stop unfair trade. <https://ustr.gov/trade-topics/trade-promotion-authority>

NASA - Vice Chair	Independent Space Agency	<ul style="list-style-type: none"> • Lead – Space Civil Programs – Artemis • Lead – Purchaser of Commercial Space Goods & Services 	TBD
State	Foreign Policy International Organizations Treaty Enforcement	<ul style="list-style-type: none"> • Lead - International Organizations & Institutions Negotiations • Lead – Bi-Lateral S&T Agreements 	TBD
Defense	National Defense & National Security	<ul style="list-style-type: none"> • Lead – Defense & Security Planning and Priorities 	TBD
Treasury/CEA	Monetary, Tax Policy	<ul style="list-style-type: none"> • Lead - Investment Incentives; Space Bonds; Insurable Risks; Crypto-Currency. • lead - Tax Incentives (R&D, Investment Credits) 	Issue paper outlining financial instruments, tax policy
Transportation	National Space Launch Agency	<ul style="list-style-type: none"> • Lead -Space Traffic Management 	Establish STM rules of the road. Update launch regime beyond Earth, e.g., cislunar.
Justice	Governing Law & Regulations	<ul style="list-style-type: none"> • Lead – Forum Conventions; Clarity on Applicable Laws & Rules, • Lead - Property Rights; Dispute Resolution; Criminal Enforcement 	Preliminary formulation of civil and criminal procedures for the protection of commercial activities on foreign space bodies, i.e., asteroids, lunar surface, including adjudication of disputes, etc.
USTR	Trade Agreements, WTO	<ul style="list-style-type: none"> • Lead – The Space Trade Agreement 	Commence negotiations with trading partners to avoid market disruption and rules of the road in the trading systems for space goods and services.
Energy	Power – Solar, Nuclear, Other	<ul style="list-style-type: none"> • Lead - Research/regulation of nuclear propulsion – off-planet 	Protocols/governance of nuclear prop. Grants via the FFRDC's and Federal labs for PPPs with the private sector
Education		<ul style="list-style-type: none"> • Lead - National STEM Curriculum 	Development of basic skills (STEM) essential to support the New Space Economy

Interior	Public Land Management; Mining, Resource Development	<ul style="list-style-type: none"> • Lead – Public Resource Ownership/Protection. • Lead - Public Land Management • Lead – Public Resource Claim Registry. • Lead – Claim & Filing regulations 	Draft rules & regulations to register, process, publicize, and adjudicate mining claims, property ownership, mineral rights – claims, extraction, sale, and dispute forums.
Agriculture	Sustainable Resources Food Quality Import & Export Regulations	<ul style="list-style-type: none"> • Lead - Research & Experimentation for Off Planet Farming. • Lead – Space Seed Selection, Crop varieties, Bio-Hazard. • Lead – Food purity, yields 	<p>Conduct research in cooperation with the private land grant universities into potential space crops, toward the goal of a sustainable food industry for off-planet populations.</p> <p>Determine applicability of new crop strains for off-planet agriculture to Earth ecosystems.</p>
NSC/CIA/NRO	Security	<ul style="list-style-type: none"> • Data Collection and Projections; Global Data Book 	<p>Lead – Situational Awareness</p> <p>Lead – Security-related data collection</p>
HHS/HUD/FDA	Health/Habitation/Pharma	<ul style="list-style-type: none"> • Research/reg of drug 	<p>Research protocols governing drug development/use in micro-gravity or limited gravity environments.</p> <p>Develop off-planet long-duration pioneer worker health metrics</p> <p>Develop in partnership with habitation commercial ventures on new human spaceflight and habitation regulations</p>
OBSERVERS	Mission	Purpose	Proposals
OMB/OSTP/PCAST	Budget Policy	Space Goals in Line with Policies	TBD
SEC	Public Oversight of Exchanges	Regulations of New Instruments and Offerings	Space Bonds, Industrial Revenue Bonds
FCC	International Bureau	Spectrum, Satellite, Space Operations licensing	Maintain policy role of preventing interference in space activities; extend the role of the wireless bureau to coordinate with commercial ventures on space-based business; Avoid burdensome regulations.



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